



RAILROAD COMMISSION OF TEXAS

HEARINGS DIVISION

OIL & GAS DOCKET No. 8A-0308435

APPLICATION OF OXY USA, INC. PURSUANT TO STATEWIDE RULES 46 AND 36 TO INJECT FLUID, INCLUDING RECYCLED CO₂ THAT CONTAINS H₂S AND METHANE, INTO A POROUS FORMATION PRODUCTIVE OF OIL OR GAS, WEST SUNDOWN UNIT (70442), WELL NUMBERS 44, 51, 61, 71, 90, 109, 112, 133, 136, 149, 152, 168, 171, 188 AND 192, SLAUGHTER FIELD, HOCKLEY COUNTY, TEXAS

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HEARD BY: Paul Dubois, P.E. – Technical Examiner
Kristi M. Reeve – Administrative Law Judge

APPEARANCES:

APPLICANT:

John Soule
John Hicks
Ameet Raichurkar
Dean Donckels
Ticiana Boncagni
Timothy Sanchez

REPRESENTING:

Occidental Permian, Ltd.

EXAMINERS' REPORT AND RECOMMENDATION

STATEMENT OF THE CASE

Pursuant to Statewide Rules 36 and 46 (16 Tex. Admin. Code §§3.36 and 3.46), OXY USA, Inc. ("OXY") seeks authority to amend existing injection permits to authorize the injection fluid containing carbon dioxide (CO₂), hydrogen sulfide (H₂S), and methane into 35 wells [Well Nos. 008, 010, 014, 018, 021, 023, 025, 031, 038, 041, 044, 048, 051, 055, 058, 061, 065, 068, 071, 075, 090, 094, 109, 112, 115, 117, 133, 136, 149, 152, 156, 168, 171, 188, and 192, ("Subject Wells")] on its West Sundown Unit ("WSDU")(Lease No. 70442), in the Slaughter Field, Hockley County, Texas. The Subject Wells are existing

wells that are located north of Sundown, Texas. All of the wells have existing authority to inject saltwater, and three of the wells have existing authority to inject CO₂ (Project No. F-0183). The WSDU has been undergoing secondary recovery (waterflood) for some time, but the effectiveness of the waterflood has significantly declined. OXY is therefore reworking the secondary recovery project into a water-alternating-gas ("WAG") project. By this application, OXY seeks to amend the injection authority allowing injection of saltwater, CO₂, H₂S and methane into all 35 of the wells.

To reduce the number of receptors within the radius of exposure (ROE), OXY will inject sweet gas into the part of the WSDU within and immediately north of the town of Sundown. Consequently, OXY's 100 part per million (PPM) H₂S ROE at the WSDU is 2,461 feet, and it includes 19 receptors. OXY's 500 ppm ROE is 1,124 feet, and it includes seven public roads. A public hearing is therefore required before the Subject Application to inject fluids containing H₂S may be granted.

As a means to efficiently manage potential protests, OXY divided the Subject Wells into two cohorts, one of which included wells northwest of Sundown and the other including wells northeast of Sundown. Subsequently, OXY filed this application as two separate dockets, one each for the northeast well cohort (Oil & Gas Docket No. 8A-0803535) and northwest well cohort (Oil & Gas Docket No. 8A-0803537).

A Pre-Hearing Conference was held on February 7, 2018, at which no persons appeared in protest of the application (either docket). The cases were subsequently consolidated. The application meets the requirements of Statewide Rules 36 and 46, with regard to the injection of fluids containing H₂S into a productive reservoir. The Technical Examiner and Administrative Law Judge (collectively "Examiners") recommend the application be granted.

GOVERNING STATUTES AND COMMISSION RULES

Statewide Rule 36

In general, Statewide Rule 36 applies to each operator who conducts operations associated with hydrocarbons that contain H₂S as a constituent, where H₂S is encountered through field production, transportation, and handling of said hydrocarbon fluids. The Subject Application falls within the applicability of Statewide Rule 36 and must provide safeguards to protect the general public from the harmful effects of H₂S. Specifically, Statewide Rule 36(c)(10) (A) states:

Injection of fluids containing hydrogen sulfide shall not be allowed under the condition specified in this provision unless first approved by the commission after public hearing:

- i. where injection fluid is a gaseous mixture, or would be a gaseous mixture in the event of a release to the atmosphere, and where the 100 ppm radius of exposure is*

in excess of 50 feet and includes any part of a public area except a public road; or, if the 500 ppm radius of exposure is in excess of 50 feet and includes any part of a public road, or if the 100 ppm radius of exposure is 3,000 feet or greater;

- ii. *where the hydrogen sulfide content of the gas or gaseous mixture to be injected has been increased by a processing plant operation (emphasis added).*

Statewide Rule 46

Statewide Rule 46 requires an operator to obtain a Commission-issued permit to conduct fluid injection operations in a reservoir productive of oil, gas, or geothermal resources. If no protest from any affected person is received by the Commission, the Commission's delegate may administratively approve the application without the need for a public hearing. Statewide Rule 46(c)(5)(B) defines "affected persons" as:

[A] person who has suffered or will suffer actual injury or economic damage other than as a member of the general public or as a competitor, and includes surface owners of property on which the well is located and commission-designated operators of wells located within one-half mile of the proposed disposal well.

DISCUSSION OF THE EVIDENCE

OXY filed administrative applications for amended injection authority as to the Subject Wells with the Oil and Gas Division's Underground Injection Control (UIC) Unit on or about October 16, 2017. The application was assigned Tracking No. 47599. The UIC subsequently made determinations that those administrative applications satisfy the requirements of Statewide Rule 46, but noted that a public hearing would be required because they involve injection of H₂S.

On December 6, 2017, OXY provided copies of the Commission Forms H-1 and H-1A for the Subject Wells in accordance with Statewide Rule 46(c)(1) to the following person/entities: (1) surface owners of the well tracts; (2) oil and gas operators within one-half mile of the well locations; (3) the Sundown City Clerk; and (4) the Hockley County Clerk. Applicant also published notice of the application on September 15, 2017 and December 12, 2017, in the *Lubbock Avalanche-Journal*, a newspaper of general circulation in Hockley County, Texas.

On January 5, 2018, the Commission sent by U.S. Mail a Notice of Pre-Hearing Conference and a Notice of Hearing to all persons on the service list. A Pre-Hearing Conference was held on February 8, 2018. No persons appeared at the Pre-hearing Conference to protest the application.

The Slaughter Field (Field) produces from the San Andres Formation at an average depth of approximately 5,000 feet below ground surface. Casinghead gas produced from the Field has an H₂S concentration in excess of 100 parts per million (ppm) and is therefore subject to the requirements provided by Statewide Rule 36. OXY submitted a copy of a Form H-9 (Certificate of Compliance Statewide Rule 36) for the WSDU, dated July 20, 2017, that indicates the H₂S content of the gas at the WSDU is approximately 7,000 ppm.

OXY plans to implement a CO₂ tertiary recovery project on the WSDU, using water alternating-gas (WAG) and water injection wells, to further enhance recovery from the WSDU. OXY seeks to revise and standardize the injection interval for all wells to 4,600 to 5,600 feet. For each Subject Well, OXY requests to inject up to 5,000 barrels of saltwater per day, 200 barrels of fresh water per day, and 10,000,000 cubic feet (10,000 MCF) of recycled CO₂ per day that contains H₂S and methane (*i.e.* sour CO₂). The source of sour CO₂ for injection on the WSDU is the Mallet CO₂ Recovery Plant that receives produced gas from a number of OXY-operated CO₂ injection projects in Hockley, Chochran and Terry Counties. Once CO₂ injection begins on the WSDU, produced casinghead gas from the WSDU will also be sent to the Malet CO₂ Recovery Plant for removal of hydrocarbon gas before the sour CO₂ is recycled for reinjection on the WSDU and other projects operated by OXY.

OXY proposes to use the 35 Subject Wells for WAG injection. All of the 35 Subject Wells already have injection authority for salt water and fresh water. Three of the already-permitted injection wells are authorized for CO₂ injection, but not for injection of H₂S (Project No. F-0183).

OXY submitted evidence that indicates it operates several other CO₂ recovery projects, similar to the WSDU, Hockley and adjoining counties. The purpose of that evidence is to show that OXY is an experienced operator of both CO₂ and sour-CO₂ floods, and that those projects resulted in increased oil recovery.

OXY used 7,000 ppm H₂S concentration to prepare Forms H-9 for the CO₂ Supply and Gathering Lines to and from the WSDU and for sour-CO₂ injection operations through the Subject Wells. OXY represented that the current H₂S concentrations of sour-CO₂ being recycled from other projects that will be used for injection on the WSDU is approximately 5,500 ppm. OXY used 7,000 ppm H₂S for preparation of the Forms H-9 because the gas supply pipeline is rated for 7,000 ppm H₂S gas.

The town of Sundown is within the south-central part of the WSDU. To reduce the number of receptors within the ROE, OXY will inject sweet gas into the part of the WSDU that is within and north of the town of Sundown. Consequently, OXY's 100 part per million (PPM) H₂S ROE at the WSDU is 2,461 feet, and it includes 19 receptors. OXY's 500 ppm ROE is 1,124 feet, and it includes seven public roads.

On November 16, 2017, the Commission's Midland District Office approved the Form H-9 and Contingency Plan submitted by OXY for sour-CO₂ injection operations on

the WSDU. The Contingency Plan complies with the requirements of Statewide Rule 36, including safeguards to protect the general public from the harmful effects of an H₂S release.

All equipment associated with the Subject Wells for injection of sour-CO₂ satisfies the requirements in the latest edition of NACE Standard MR-0175. The WSDU supply and gathering lines will be monitored for pressure loss via automated pressure transmitters and emergency shut down valves. There are similar shut down valves on the WSDU. Low level H₂S detectors will be installed at the location of the Subject Wells' nearest dwellings located on or near the WSDU within the 100 and 500 ppm ROEs. Alarms will notify OXY employees if the emergency shut down valves or the detectors are activated, indicating the possible presence of a leak.

FINDINGS OF FACT

1. Pursuant to 16 Texas Administrative Code §§3.36 and 3.46, OXY seeks to amend the non-commercial injection permit for its West Sundown Unit Well Nos. 008, 010, 014, 018, 021, 023, 025, 031, 038, 041, 044, 048, 051, 055, 058, 061, 065, 068, 071, 075, 090, 094, 109, 112, 115, 117, 133, 136, 149, 152, 156, 168, 171, 188, and 192, Slaughter Field, Hockley County, Texas, to inject fluid containing hydrogen sulfide ("H₂S") into a reservoir productive of oil and gas.
2. On December 6, 2017, OXY provided copies of the Commission Forms H-1 and H-1A for the Subject Wells in accordance with Statewide Rule 46(c)(1) to the following person/entities:
 - a. surface owners of the well tracts;
 - b. oil and gas operators within one-half mile of the well locations;
 - c. the Sundown City Clerk; and
 - d. the Hockley County Clerk.
3. OXY published notice of the application on September 15, 2017 and December 12, 2017, in the *Lubbock Avalanche-Journal*, a newspaper of general circulation in Hockley County, Texas.
4. The application is not protested.
5. The Slaughter Field (Field) produces from the San Andres Formation at an average depth of approximately 5,000 feet below ground surface.
 - a. Casinghead gas produced from the Field has an H₂S concentration in excess of 100 parts per million (ppm) and is therefore subject to the requirements provided by Statewide Rule 36.

- b. Produced gas is processed for reinjection, which increases the H₂S concentration.
 - c. The H₂S content of the gas injected at the WSDU is less than 7,000 ppm.
6. OXY currently operates a waterflood on the WSDU (Project No. F-01843).
 - a. All of the 35 Subject Wells already have injection authority for salt water and fresh water.
 - b. Three of the already-permitted injection wells are authorized for CO₂ injection, but not for injection of H₂S.
 - c. The waterflood is no longer operating efficiently.
7. OXY plans to implement a CO₂ tertiary recovery project on the WSDU, using water alternating-gas (WAG) injection wells.
8. The amended project will include the following elements:
 - a. The injection interval will be from 4,600 to 5,600 feet.
 - b. Authority to inject up to 5,000 barrels of saltwater per day.
 - c. Authority to inject up to 200 barrels of fresh water per day
 - d. Authority to inject up to 10,000,000 cubic feet of gas per day, including recycled CO₂, up to 7,000 ppm H₂S, and methane.
9. The 100 ppm H₂S ROE at the WSDU is 2,461 feet, and it includes 19 receptors.
10. The 500 ppm ROE is 1,124 feet, and it includes seven public roads.
11. On November 16, 2017, the Commission's Midland District Office approved the Form H-9 and Contingency Plan submitted by OXY for sour-CO₂ injection operations on the WSDU.
12. The Contingency Plan complies with the requirements of Statewide Rule 36, including safeguards to protect the general public from the harmful effects of an H₂S release.
13. All equipment associated with the Subject Wells for injection of sour-CO₂ satisfies the requirements in the latest edition of NACE Standard MR-0175.

14. The WSDU supply and gathering lines will be monitored for pressure loss via automated pressure transmitters and emergency shut down valves. There are similar shut down valves on the WSDU.
15. Low level H₂S detectors will be installed at the location of the Subject Wells' nearest receptor locations on or near the WSDU within the 100 and 500 ppm ROEs.
16. Alarms will notify OXY employees if the emergency shut down valves or the detectors are reactivated, indicating the possible presence of a leak.
17. The Commission's Midland District Office approved the Form H-9 (Certificate of Compliance with Statewide Rule 32) and the Contingency Plan submitted by OXY for sour-CO₂ injection on the Unit.
18. The planned sour-CO₂ flood will result in the recovery of incremental hydrocarbons at the Unit.

CONCLUSIONS OF LAW

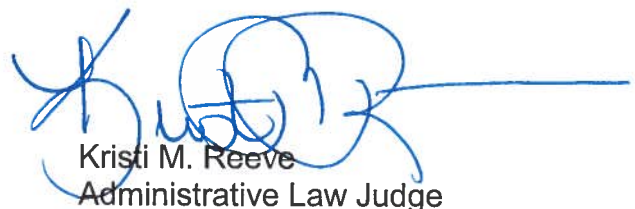
1. Resolution of the Subject Application is a matter committed to the jurisdiction of the Railroad Commission of Texas. Tex. Nat. Res. Code § 81.051
2. Proper notice was issued in accordance with all applicable statutes and regulatory codes. 16 Tex. Admin. Code § 3.46
3. The subject application meets the applicable requirements of Statewide Rules 36 and 46.

EXAMINERS' RECOMMENDATION

The Examiners recommend that OXY's application for its proposed injection authority in its WSDU Well Nos. 008, 010, 014, 018, 021, 023, 025, 031, 038, 041, 044, 048, 051, 055, 058, 061, 065, 068, 071, 075, 090, 094, 109, 112, 115, 117, 133, 136, 149, 152, 156, 168, 171, 188, and 192, Slaughter Field, Hockley County, Texas to inject materials containing hydrogen sulfide be granted.



Paul Dubois, P.E.
Technical Examiner



Kristi M. Reeve
Administrative Law Judge